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# Mitigating Environmental Externalities Through Voluntary and Involuntary Water Reallocation: Nevada's Truckee-Carson River Basin

## INTRODUCTION

A transition from the era of building water projects and developing new supplies to an era of water reallocation is well underway in most of the West.[1] Two decades ago, experts were debating the ability of western water institutions, originally conceived to serve the earliest non-native water diverters—irrigators and mines—to adapt to the growing demands of cities.[2] By acquiring water formerly used to grow crops, through voluntary market transactions, western cities have demonstrated that water law and policy prove flexible when the economic and political stakes are high enough.[3]

Initially fueled by urban growth, water reallocation is now being stimulated by a new array of forces. Throughout the West, water reallocation is beginning to reflect environmental benefits alongside the traditional uses for water in irrigation, cities, and industry. Some reallocations have involved market transfers of water arranged through voluntary negotiations; others have involved involuntary reallocations prompted by court rulings. This article argues that both types of reallocation will continue to be important in managing western water resources, but that each has quite different implications for the distribution of benefits and costs from reallocation.

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1. For a historical analysis of western water's transition from construction to reallocation and comprehensive management, see M. Reisner, Cadillac Desert (1986).

2. *See generally* Wilkinson, *Western Water Law in Transition*, Am. Water Works A.J., Oct. 1986, at 34.

3. Los Angeles, Denver, Phoenix, Reno, Salt Lake City, and Albuquerque are among those municipalities that have acquired long-term supplies from rural agriculture. For a review of water market activity, see B. Saliba & D. Bush, Water Markets in Theory and Practice (1987), and the various volumes of *Water Market Update* published from 1987-89.

A wide array of reallocations have been implemented, or are being considered, in response to environmental concerns. Environmental values are also influencing new water allocations and water project development. A 1983 California Supreme Court decision laid the foundation for ordering the City of Los Angeles to modify its diversions from the Mono Lake area for the sake of birds, wildlife, and a unique ecosystem, despite the fact that the diversions were based on valid, longstanding rights to divert water from this area.[4] The Northwest Power Planning Council frequently must consider the growing impact that environmental considerations have on water allocation.[5] Hydroelectric dam construction in the Northwest has diminished the once vibrant steelhead and salmon runs that are vital to the region's economy, ecology, and indigenous peoples. The Council has broadened the array of interests that participate in power planning and river management decisions so that its decision processes explicitly incorporate tradeoffs between power, fish, and wildlife. Consideration of such tradeoffs has been prompted, thus far, by voluntary negotiations among affected parties. However, if some anadromous fish now being considered for listing do become listed as endangered by the federal government, then water reallocation will become necessary to comply with the Endangered Species Act.[6] Similarly, under pressure from environmental groups, the Secretary of the Interior announced in 1990 that water contract renewal for federal irrigation projects in California's Central Valley will require compliance with the National Environmental Policy Act.[7] This first step in reassessing water allocations for irrigation, which have traditionally ignored environmental values, could enhance fish and wildlife habitat in central California.[8] As yet another example, in 1989 the EPA vetoed the Clean Water Act permit required to construct the Two Forks Dam on the South Platte River upstream of Denver.[9] The project would have provided almost 100,000 acre-feet of water to the Denver area, while inundating scenic recreation areas, destroying a gold medal trout fishery, and jeopardizing the downstream habitat of endangered whooping cranes.[10]

4. National Audubon Soc'y v. Superior Court, 33 Cal. 3d 419, 658 P.2d 709, 189 Cal. Rptr. 346 (1983). The city's diversions were allowable under the California appropriative water rights system. *Id.* at 422, 658 P.2d at 712, 189 Cal. Rptr. at 349.

5. *See generally* Pacific Northwest Electric Power Planning and Conservation Act, Pub. L. No. 96-501, 94 Stat. 2697 (1980).

6. *See* 16 U.S.C. §§ 1533, 1536 (1988 & Supp. 1990). Section 1536(a)(2) states that "[e]ach Federal agency shall . . . insure that any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species."

7. *See* 42 U.S.C. §§ 4321 to 4395 (1988 & Supp. 1990).

8. 2 Water Rights (R. Smith ed. 1989).

9. 3 Water Intelligence Monthly, Dec. 1990, at 6.

10. *Id.*

This article explores the challenges that arise as environmental externalities become a consideration in western water reallocation. The analysis evaluates voluntary water transfers and exchanges as tools for conflict resolution, for accommodating environmental values, and for expanding the benefits generated by regional water resources. Voluntary transfers are compared to involuntary reallocations prompted by judicial rulings. Both types of reallocations will continue to be important for western water, but the magnitude and distribution of costs and benefits differs significantly depending on the approach taken to reallocating water. The central issues are illustrated by examining the Truckee-Carson Basin in Nevada.

Nevada's Truckee and Carson River basins embody all of the complex issues that now challenge western water managers and policy makers. Figure 1 highlights the geographical features of this area, a microcosm of the West's struggle to manage water fairly and efficiently. Water conflicts among basin cities, Native Americans, fish and wildlife managers, and irrigated agriculture have extended through most of the twentieth century. Cities seek new water supplies to sustain rapid population growth and to serve as a buffer against drought. Two Indian tribes are asserting their rights to area waters and one of these, through decades of litigation and negotiation, has become a powerful force for water reallocation. The rivers support endangered and threatened fish species. The management of these rivers is intimately connected with the Stillwater National Wildlife Refuge, a wetland that is a crucial stopover for migratory birds along the Pacific Flyway. The region is also the site of one of the earliest Bureau of Reclamation projects, with a constituency wary of any reallocation of waters to which irrigators have long had access. Private investors are buying up irrigated acreage in the hopes of turning a profit as area water values rise. Water quality issues, including effluent disposal and irrigation runoff, overlay the complex water allocation issues. Interjurisdictional water conflicts arise as California and Nevada seek to manage the interstate waters of the Truckee and Carson Rivers, and of groundwater basins along the states' shared border.

The next section of this article provides an overview of the economic values that motivate water reallocation for environmental purposes. The following section briefly describes water interests in the Truckee-Carson basin, the evolution of water institutions and infrastructure, and the pressures for change in water management and allocation. The final section looks at institutional innovations that may accommodate the changing needs of the area. The emphasis throughout is on incorporating environmental considerations into the western water allocation framework that originally evolved to protect offstream diversions for mining and agriculture, and on mitigating externalities by reallocating water from one use to another.

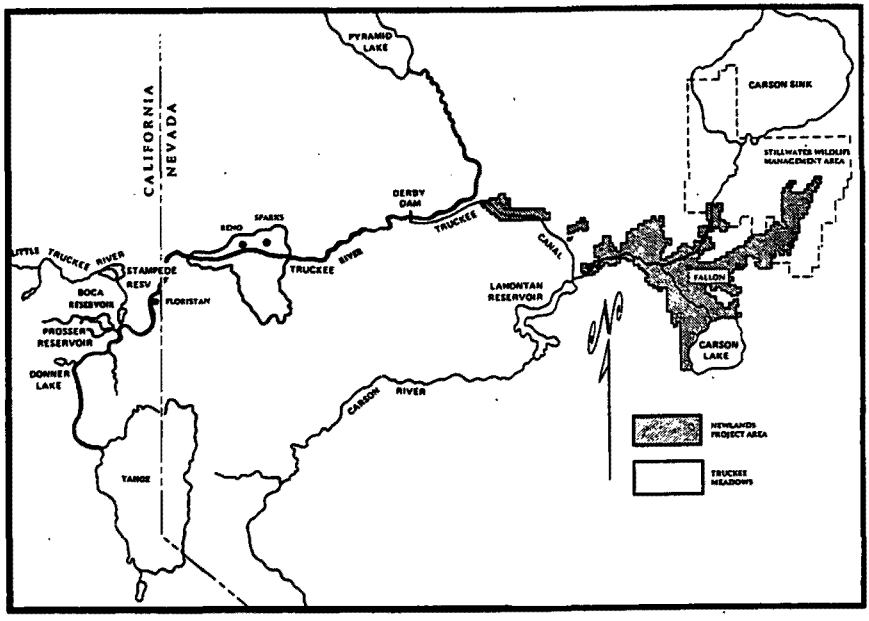


FIGURE 1
Truckee Carson River Basins

## ENVIRONMENTAL EXTERNALITIES AND TRANSACTIONS COSTS IN WATER REALLOCATION

Scarcity is a key concept in considering the economic tradeoffs in allocating water among different uses. Economists define a resource as scarce when not enough of it is available to satisfy demand and, consequently, some allocative decisions must be made regarding who will have access to the resource and under what conditions.[11] The prior appropriation doctrine evolved in response to economic scarcity, as water users realized an allocative process was needed to settle conflicts and facilitate orderly use of water resources.[12] As new economic values arise, pressure increases to modify allocative processes in order to recognize and accommodate new demands. During the era of water development

11. A. Randall, Resource Economics 11-31 (1987).

12. *See* J. Sax & R. Adams, Legal Control of Water Resources 154 (1986). Under the prior appropriation doctrine, "[o]ne's priority is determined by the date at which he or she first applied water to a beneficial use, or the date on which the work leading to the application was begun." *Id.* at 279. Nine western states currently follow the prior appropriation system: Alaska, Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming. Comment, *Liability Rules as a Solution to the Problem of Waste in Western Water Law: An Economic Analysis*, 76 Calif. L. Rev. 671, 675 (1988). Eight other states in the West have mixed allocation systems. *Id.*

in the West, water was "reallocated" from streams and lakes where it supported fisheries and wildlife to offstream irrigation, industrial, and urban uses. This process created environmental externalities in the form of diminished flows and consequent decreases in the benefits generated by stream flows. However, these externalities appeared trivial compared to the benefits of water development. As natural environments in the West became more scarce over decades of development, as outdoor recreation became a vital sector of the western economy and as society became more environmentally oriented, some of the externalities generated by water development no longer seemed trivial. The proliferation of legislation and litigation related to instream flow protection during the last decade is one indication that environmental considerations have become important enough in the economy of the West to challenge a legal framework originally designed to promote offstream water uses.[13]

## Economic Benefits and Instream Water Values

Water in lakes and streams provides many different types of economic benefits. Adequate stream flows and lake levels are vital in preserving fish and wildlife habitat in the arid West. Water-based recreation is an important part of many Westerners' leisure activities, and water-related recreation opportunities draw visitors and tourism dollars to the West.[14] Many small towns and tribal reservations rely on outdoor recreation and tourism as a significant source of livelihood. Spending on food, lodging, and recreational equipment supports rural businesses and stimulates local and tribal economies.[15]

Stream flows also enhance water quality. A stream's dilution capacity provides economic benefits related to the treatment costs that dischargers and downstream water users would otherwise incur. As stream flows become depleted, water quality standards are more likely to be violated, and municipal sewage treatment plants and industrial dischargers must incur additional expenses to comply with state and federal water quality standards. The treatment cost savings provided by adequate stream flows are likely to increase as stricter federal discharge standards are implemented.[16]

Nonuser values, benefits to individuals who have not directly used

13. For a summary, *see generally* L. MacDonnell, Instream Flow Protection Law and Policy (1989).

14. *See* 23 Water Resources Res. (1987) for a review of various approaches.

15. *See id.*; K. Boyle & R. Bishop, Lower Wisconsin River Recreation: Economic Impacts and Scenic Values (Jan. 1984) (Univ. Wis. Agric. Econ. Staff Pap. Ser. 216); Loomis, *The Economic Value of Instream Flow: Methodology and Benefit Estimates for Optimum Flows*, 24 J. Envtl. Mgmt. 169-79 (1987).

16. *See generally* 33 U.S.C. §§ 1311 to 1330 (1988) (Subchapter III of the Federal Water Pollution Control Act of 1977, also known as the Clean Water Act).

streams for recreation but wish to preserve them for their own future use or for future generations, can be sizable—especially for unique recreation sites and for endangered species habitat. Researchers have documented nonuser values ranging from $40-$80 per year per nonuser household for stream systems in Wyoming, Colorado, and Alaska.[17] Research has shown that individuals' willingness to pay to preserve the level of California's Mono Lake, although based partly on the enjoyment stemming from an actual site visit, can be largely attributed to the satisfaction of knowing the lake would be preserved and guaranteeing site availability for the future. These nonuser values accounted for over eighty percent of total willingness to pay for preserving Mono Lake natural resources.[18]

As the studies cited demonstrate, researchers can estimate the economic value of water in environmental uses and compare it to the value of water in offstream uses. In some instances, the benefits generated by keeping another acre-foot of water in a stream, lake, or wetland are greater than the marginal value of water in competing offstream uses.[19] The costs of stream flow externalities generated by offstream diversions are no longer trivial, and this increased recognition of the value of water in supporting fisheries, wildlife, recreation, and Native American cultures has created pressure for change throughout the West and particularly in the Truckee-Carson Basin.

## Transactions Costs and Consideration of Environmental Externalities

Transactions costs, in the economics literature, are the costs of making a market system work—defining property rights unambiguously enough so that sales can take place, generating information about commodities available, searching for trading partners, negotiating terms of exchange and contract provisions, and enforcing both property rights and contracts to buy and sell.[20] In western U.S. water markets, parties incur transactions costs in searching for water supplies and willing buyers and sellers, ascertaining the characteristics of water rights, negotiating price and other terms of transfer, and obtaining legal approval for the proposed change

17. R. Greenley, R. Walsy & R. Young, Economic Benefits of Improved Water Quality (1982); Madariago & McConnell, *Exploring Existence Value*, 23 Water Resources Res. 936 (1987).

18. J. Loomis, Economic Evaluation of Public Trust Resources of Mono Lake (1987) (U. Cal.-Davis, Inst. of Ecology Rep. No. 30).

19. Colby, *Enhancing Benefits in an Era of Water Marketing*, 26 Water Resources Res. 1113-20 (1990).

20. Coase, *The Problem of Social Cost*, 3 J. Law & Econ. (1960); Cheung, *Transaction Costs, Risk Aversion and the Choice of Contractual Arrangements*, 18 J. Law & Econ. 535 (1975); Demsetz, *The Exchange and Enforcement of Property Rights*, 7 J. Law & Econ. 11 (1964).

in water use.[21] Transfer applicants and objectors incur this latter category of transactions costs as they seek to obtain state approval to transfer a water right to a new place and purpose of use. These costs may include attorney's fees, engineering and hydrologic studies, court costs, and fees paid to state agencies.[22]

As environmental values make their way into the western water arena, the transactions costs of implementing water transfers rise. Litigation to establish the legal standing of environmental interests is often initiated in order to force current water right holders to account for environmental externalities.[23] State procedures to evaluate proposed water transfers become more complex and costly when the processes must address environmental impacts along with the traditional assessment of transfer impacts on other water right holders.[24] Transactions costs are an important issue in western water reallocation. If the costs of implementing a voluntary water transfer become too high, many beneficial transfers will not take place and water supplies will remain locked into suboptimal use patterns. On the other hand, the ability to impose transactions costs on those proposing to transfer water, an ability conferred by state laws governing who may effectively object to a transfer, represents bargaining power in the water allocation process.[25] Parties undertake market transactions for economic gain, based on the perception that water supplies will generate higher returns in their new use than in their former use. The power to erode this expected gain by imposing transactions costs gives third parties leverage with transfer proponents, forces transfer proponents to internalize some external costs of transfers, and gives environmental values a role in the water reallocation process. In this light, some transactions costs may be necessary and are justified by the need to better account for externalities and public values when water transfers are evaluated.[26] Water reallocation policies must balance the transactions costs necessary to insure that externalities are adequately addressed when water is transferred with the goal of facilitating transfers for which the net benefits are genuinely positive. The case study in this article demonstrates both the high transactions costs of considering environmental externalities and the effectiveness of giving environment interests legal standing to influence water allocation decisions.

21. Colby, *Transactions Costs and Efficiency in Western Water Allocation*, 72 Am. J. Agric. Econ. 1184 (1990).

22. *Id.*

23. *Id.*

24. *See generally* Colby, McGinnis & Rait, *Procedural Aspects of State Water Law: Transferring Water Rights in the Western States*, 31 Ariz. L. Rev. 697 (1989).

25. *Id.*

26. Colby, *supra* note 21, at 1185.

## OVERVIEW OF THE TRUCKEE AND LOWER CARSON RIVER BASINS

The geographical focus of this article is the Truckee River Basin, the lower Carson River Basin, and adjacent areas in western Nevada. Most of the area's population of 250,000 is concentrated in and around the cities of Reno and Sparks, located in a valley known as the Truckee Meadows. The Meadows are flanked on the west by the Sierra Nevada Mountains and on the east by the Great Basin. Most agricultural activity is concentrated in the Newlands Project, located in the Lahonton Valley, about fifty miles east of the Truckee Meadows and managed by the Truckee-Carson Irrigation District (TCID).

The Truckee River begins at Lake Tahoe in California, crosses the state line into Nevada, and flows east past farms and ranchlands surrounding Reno and Sparks. It approaches the western edge of TCID and then turns north to empty into Pyramid Lake. The Carson River also originates in California's Sierra Nevada Mountains. The Carson River roughly parallels the Truckee River about twenty miles to the south, ending in the Lahontan Valley south and east of Pyramid Lake. Prior to the 1900s, river flows supported a rich array of fish, birds, and other wildlife around lakes and extensive wetlands.

### Water Use Patterns

#### Surface Water

Users in northwestern Nevada divert an average of 750,000 acre-feet of Truckee River water per year for irrigation, municipal, and industrial purposes. Municipal and industrial users consume roughly 75,000 acre-feet in the Truckee Meadows, while irrigators use 675,000 acre-feet.[27] The TCID accounts for almost two-thirds of the region's irrigation use. Consumptive use of Truckee River water has risen since the turn of the century, and the quantity of water replenishing Pyramid Lake has declined considerably. Falling lake levels have alarmed sportsmen, conservationists, and the Pyramid Lake Indian Tribe.[28]

TCID uses an average of 387,000 acre-feet of water annually from rights developed on the Truckee River and on the Carson River. The Truckee Canal carries water that TCID takes from the Truckee River into the Lahontan Reservoir, where it mingles with roughly an equivalent quantity of water from the Carson River before TCID distributes it over 73,000 irrigated acres.[29] A joint agreement among TCID, the State of

27. B. Saliba & D. Bush, *supra* note 3, at 98.

28. D. Yardas, Water Transfers and Paper Rights in the Truckee and Carson River Basins (June 1989) (paper presented at the American Water Resources Association Symposium "Indian Water Rights and Water Resources Management").

29. Z. Willey & D. Yardas, Least Cost Water Supply Planning in the Truckee and Carson River Basins (1987) (paper presented at the Nevada Water Resource Association Annual Conference).

Nevada, and the United States Fish and Wildlife Service provides that return flows from the Newlands Project be allowed to drain into the marshlands of the Stillwater Wildlife Management Area (SWMA).[30]

Irrigators outside TCID hold individual rights for Truckee River water. A number of ditch companies once provided Truckee River water to irrigators in the Truckee Meadows. Many of these companies are now inactive because the lands within their service areas have been urbanized and their water rights transferred to Sierra Pacific Power Company.

### Groundwater

Municipal and industrial uses in Reno and Sparks consume approximately 12,000 acre-feet of groundwater annually.[31] A small number of domestic users in the Truckee Meadows area outside of Reno and Sparks and a few irrigators use another 2,000 to 3,000 acre-feet per year. Groundwater quality varies within the Truckee Meadows and is so poor in some locations that it cannot be used unless it is mixed with Truckee River water. Individual users in the TCID pump groundwater on a limited basis; TCID itself has no groundwater rights.

The state engineer regulates groundwater withdrawals in the Truckee Meadows. Non-agricultural water users located outside of the service area of water purveyors generally have had to rely on local groundwater supplies to meet their water demands. The state engineer has closed groundwater basins in the area to additional appropriation; therefore, new water users must acquire existing water rights before they can pump groundwater.

### Water Storage and Conveyance Facilities

Lake Tahoe and Boca Reservoir serve as area-wide regulatory and storage facilities for the Truckee River. Sierra Pacific Power Company also operates two small privately-owned reservoirs, Donner Lake and Independence Lake. The Bureau of Reclamation originally developed a third facility, Stampede Reservoir, as a multi-purpose, supplemental water supply. In response to litigation by the Pyramid Lake Paiute Tribe (PLPT),[32] the Bureau began to manage the reservoir to support fisheries in the lower Truckee River and Pyramid Lake. Subsequent negotiations have made some of Stampede Lake's capacity available for municipal use and urban drought protection. The Truckee Canal diverts over half of the flows in the Truckee River into the Lahontan Reservoir on the Carson River. TCID operates the canal and reservoir, along with a small hydropower plant at Lahontan Dam.

30. D. Yardas, *supra* note 28, at 1-4.
31. B. Saliba & D. Bush, *supra* note 3, at 130-40.
32. *See infra* note 56 and accompanying text.

## PARTIES TO CURRENT WATER CONFLICTS

### Current Water Right Holders

Several parties have long standing rights to use water in the Truckee and Carson Basins. These parties stand to bear considerable losses if some of these rights are involuntarily reallocated to other uses by court ruling. On the other hand, agricultural right holders could benefit from voluntary market negotiations by selling some of their rights for other uses. Urban water providers can, and have, benefitted from market transactions that allow them to acquire more water at a reasonable cost. These parties have a considerable stake in whether future reallocations will be voluntary or involuntary.

### Local Governments and Sierra Pacific Power Company

Reno and Sparks, regional centers for commerce and tourism, have a metropolitan area population of about 185,000 and an average growth rate during the 1980s of five and a half percent.[33] About eighty percent of their water supplies come from the Truckee River and its tributaries. The vast majority of urban residents and industry receive gas, water, and electrical service from the Sierra Pacific Power Company (SPPC), a privately owned utility. Washoe County, which includes Reno and Sparks and is the most urban county in the area, is also experiencing considerable growth and is providing water service for residents in some areas not served by SPPC.[34]

Residential water use in the Reno-Sparks area is largely unmetered.[35] Per capita use is relatively high at around 300 gallons per day.[36] Residential water users pay a flat rate for water service. Residential use, which accounts for about sixty percent of urban area use, is split evenly between indoor and outdoor uses.[37]

SPPC holds rights to approximately 70,000 acre-feet of surface water and about 12,000 acre-feet of groundwater.[38] SPPC, the cities, and Washoe County typify growing areas of the West in their search for water supplies that will support new residents in the style to which immigrating urban dwellers have become accustomed. Lawns, fountains, pools, and verdant landscaping belie the desert surroundings and attract newcomers. In ad-

33. D. Yardas, *supra* note 28, at 3.
34. B. Saliba & D. Bush, *supra* note 3, at 149.
35. Z. Willey & D. Yardas, *supra* note 29, at 3.
36. *Id.*
37. *Id.*
38. B. Saliba & D. Bush, *supra* note 3, at 145-53. The 1944 *Orr Ditch* decree awarded SPPC 29,000 acre-feet. United States v. Orr Ditch Co., Final Decree No. A-3 (D. Nev. 1944), *cited in* United States v. Alpine Land & Reservoir Co., 878 F.2d 1217, 1220 (9th Cir. 1989). SPPC has acquired the remainder by purchasing irrigation rights. See B. Saliba & D. Bush, *supra* note 3, at 145-53.

dition to pursuing water for new growth, water providers also urgently seek supplies that are reliable during the droughts to which the region is susceptible.[39]

**Truckee-Carson Irrigation District**

TCID operates the Newlands Project, authorized in 1903 as a forerunner of the western reclamation effort.[40] As one of the first major water diverters in the area, TCID has senior rights to the Carson River, which flows through the district, and to the Truckee River, from which water is imported through the Truckee Canal. The project diverts about 387,000 acre-feet annually to irrigate close to 58,000 acres. Seventy-three thousand acres within TCID are designated irrigable and have water rights of 3.5 to 4.5 acre-feet per acre.[41] The decrees that govern the Carson and Truckee Rivers established the water duty for the project.[42]

Alfalfa and irrigated pasture account for over eighty-five percent of TCID's irrigated acreage.[43] Grains, other hay crops, and a small amount of vegetables, fruits, and specialty crops make up the remainder.[44] Farmers pay five to seven dollars per acre-foot of water delivered to cover operation and maintenance of water storage and delivery works and drainage systems.[45] Farmers here installed 350 miles of deep open drains in TCID to carry away agricultural runoff.[46] Much of this water drains into Stillwater Wildlife Refuge, where studies have attributed recent increases in bird and fish mortality to contaminated runoff water and to reductions in water inflows to the refuge.[47]

Local governments, SPPC, and TCID represent the parties who have held legal entitlements to Truckee and Carson River water over the last four decades. Federal adjudication of the Truckee and Carson Rivers set forth the water rights of various parties in Nevada and California.[48] A federal water master administers these rights under the Orr Ditch Decree and the Alpine Decree.[49] Current pressures for change challenge these water allocations and the economic benefits they have provided.

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39. B. Saliba & D. Bush, *supra* note 3, at 143-50.

40. *See Alpine Land & Reservoir Co.*, 878 F.2d at 1220; *see also* United States v. Truckee-Carson Irrig. Dist., 649 F.2d 1286, 1290-92 (9th Cir. 1981).

41. B. Saliba & D. Bush, *supra* note 3, at 137-43.

42. *Alpine Land & Reservoir Co.*, 878 F.2d at 1220; *see also Truckee-Carson Irrig. Dist.*, 649 F.2d at 1290-92.

43. Z. Willey & D. Yardas, *supra* note 29.

44. *Id.*

45. *Id.*

46. *Id.*

47. *Id.*

48. A detailed analysis of the decades of complex litigation involving the parties in this area is beyond the scope of this article. For a brief overview of a portion of the litigation, see United States v. Alpine Land & Reservoir Co., 878 F.2d 1217 (9th Cir. 1989).

49. *Id.*

## Pressures for Water Reallocation

### Pyramid Lake Paiute Tribe

One of the most powerful and persistent forces for change has been the Pyramid Lake Paiute Tribe (PLPT). The tribe's ancestral home and present-day reservation entirely surrounds Pyramid Lake. This high desert lake is the terminus of the Truckee River. It is, therefore, the receiving body for whatever quantity and quality of flows are left in the river after diversions for Reno, Sparks, irrigators in the Truckee Basin, and exports to the Carson Basin for TCID. Archaeological evidence and tribal traditions indicate a close cultural link between PLPT and two particular fish species—the endangered Cui-ui and the rare, indigenous Lahontan cut-throat trout.[50] Although the Orr Ditch Decree allocated 30,000 acre-feet to the Pyramid Lake Paiute Tribe for irrigation purposes, the decree did not recognize the tribe's historic reliance on the fisheries in the lower Truckee River and Pyramid Lake. The failure to reserve water specifically to support fisheries and maintain lake levels has been an impetus for decades of litigation.[51]

Over the course of the twentieth century, flows into Pyramid Lake have been cut by more than half due to upstream diversions on the Truckee River, the lake's only permanent water source.[52] Equal in importance to the quantity of water flowing into Pyramid Lake is its temperature and quality. Clean, cool water is essential for fish reproduction.[53] Lake water quality is particularly vulnerable to upstream land and water uses because the lake, as the receiving body for the river, accumulates nutrients and other materials.

In response to the lack of water to preserve Pyramid Lake and maintain the lower Truckee River fishery, the United States brought suit against the parties of the Orr Ditch Decree in 1973.[54] In 1983, the United States Supreme Court held that the water allocations in the decree were res judicata and, therefore, all parties were bound by the Decree.[55] In a related case, the tribe filed suit in 1981 against California water purveyors seeking Truckee River rights with an early priority.[56]

50. *See* 16 U.S.C., §§ 1531-43 (1988); D. Yardas, Birds v. Fish: An Environmental Perspective on Water Resource Conflicts in the Truckee-Carson River Basins (comments prepared for the "Water in Balance Forum," Reno, Nevada, May 1987 mimeograph). The Cui-ui was put on the Endangered Species List in 1967. C. Buchanan & M. Coleman, The Cui-ui, Endangered Species Accounts (1987) (publication by the National Audubon Society). For a detailed analysis of the interrelationship between the Paiutes and the Cui-ui, see generally M. Knack & O. Stewart, As Long as the River Shall Run: An Ethnohistory of the Pyramid Lake Reservation (1984).

51. B. Saliba & D. Bush, *supra* note 3, at 139-53.

52. D. Yardas, *supra* note 50.

53. C. Buchanan & M. Coleman, *supra* note 50.

54. *See* Nevada v. United States, 463 U.S. 110, 113 (1983).

55. *Id.* at 143-45.

56. Pyramid Lake Paiute Tribe of Indians v. California, No. Civ. S-81-378 RAR (E.D. Cal. filed 1981).

The PLPT has won some important victories pertaining to river management. In 1980, in response to litigation based on the Endangered Species Act, the federal government reallocated the storage capacity of Stampede Reservoir to maintain the flow and temperature of water for endangered fish habitat.[57] This 227,000 acre-feet was originally intended to serve municipal and irrigation interests. The Carson-Truckee Conservancy District and Sierra Pacific Power Company unsuccessfully appealed the Secretary of Interior's decision to reallocate Stampede Reservoir supplies in the federal district court and the Ninth Circuit Court of Appeals.[58] Further, in 1985 the PLPT was successful in modifying the operating criteria for the Truckee River to maintain and enhance fisheries; this resulted in reduced water exports to the Carson Basin for TCID and reduced water availability for other Truckee Basin water users.[59]

With a series of court decisions recognizing the importance of the Cui-ui and of the PLPT's reliance on fisheries, and with high transactions costs for all parties, the PLPT did become a key player in ongoing discussions regarding river management. In a recently completed round of negotiations, the PLPT paved the way for more cooperative arrangements by agreeing that some Stampede Reservoir water could be used for urban demand. This agreement included a number of concessions by other parties, such as the installation of residential water meters in Reno and Sparks and a commitment to urban water conservation by the cities and SPPC.[60] Congress passed a negotiated settlement in late 1990 to formalize the agreement among local interests and to provide federal support for implementing the agreement.[61] The bill specifically authorized purchases of water to mitigate environmental externalities in the Truckee and Carson River Basins.[62]

### Stillwater Wildlife Management Area

The linkage between the Truckee and Carson Rivers, via the Truckee Canal,[63] has posed complex tradeoffs between the environmental integrity of Pyramid Lake and that of the Stillwater Wildlife Management Area (SWMA). Like Pyramid Lake, the SWMA is located at the terminus of a river—in this case the Carson River, which flows through TCID before dissipating into the marshlands of the Lahontan Valley, site of the SWMA.

57. D. Yardas, *supra* note 50; B. Saliba & D. Bush, *supra* note 3, at 139-51.

58. Carson-Truckee Conservancy Dist. v. Clark, 741 F.2d 257 (9th Cir. 1984).

59. U.S. Dep't of Interior Revised Operating Criteria and Procedures for the Truckee River (1985).

60. S.1554, 101 Cong., 1st Sess., January 3, 1989; *see also* Kramer, *Lake Tahoe, the Truckee River, and Pyramid Lake: The Past, Present, and Future of Interstate Water Issues*, 19 Pac. L.J. 1139 (1989).

61. Truckee-Carson Pyramid Lake Water Rights Settlement Act of 1990, Pub. L. No. 101-618, 104 Stat. 3289 (1990).

62. *Id.*

63. The Truckee Canal has diverted about half of average annual Truckee River flows for much of the twentieth century.

SWMA is a critical link on the Pacific Flyway. In good water years, the SWMA[64] supports hundreds of thousands of birds including ducks, geese, whistling swans, egrets, and herons.[65] In addition to its inherent benefits of natural diversity, the area provides high quality fishing and hunting opportunities. A recent study indicates that twenty percent of economic activity in the rural country in which SWMA is located is linked to tourism and recreation dependent upon water and wildlife resources.[66] However, due to upstream uses that have reduced historic inflows to the Lahontan Valley, less than a third of the original wetland areas at the end of the Carson River remain. The resultant overcrowding and increased competition for food have adversely affected waterfowl populations, as has an increase in chemical wastes from irrigation runoff.[67]

### Fallon Paiute-Shoshone Tribe

The Fallon Paiute-Shoshone Tribe's (FPST) homeland and current reservation is located in the Lahontan Valley wetlands at the terminus of the Carson River. The tribe asserts that the federal government has never fulfilled its early promises to provide irrigation water and drainage on tribal lands.[68] In 1978, the United States Congress acknowledged some unfulfilled promises and added 2,420 acres to the reservation.[69] The government has completed some irrigation development, in the form of a deep irrigation drain installed on tribal lands that directs flows of toxic materials released from disturbed soils onto adjacent wetlands.[70] The FPST's claims to water and agricultural development represent another piece in the complex puzzle.

### Investors

Investment activities have stimulated another pressure for water reallocation. Washoe County, concerned about assuring supplies for growing county populations located outside of the SPPC service area, has collaborated with Western Water Development, a private investment group, to acquire groundwater in Honey Lake Basin and convey it to Washoe County.[71] Another investment group, Prudential-Bache, purchased a 2,700-acre ranch on the upper Carson River in 1988 with plans to make the

64. The SWMA, consisting of 224,000 acres, contains the Stillwater National Wildlife Refuge.

65. Fish & Wildlife Serv., U.S. Dep't of Interior, Environmental Assessment, Acquisition of Water Rights for Stillwater Wildlife Management Area (1989).

66. D. Yardas, *supra* note 50.

67. *Id.*

68. Bureau of Indian Affairs, U.S. Dep't of Interior, Water Problems on Fallon Indian Reservation (1970).

69. Act of Aug. 4, 1978, Pub. L. No. 95-337, 92 Stat. 455 (1978).

70. Fish & Wildlife Serv., *supra* note 65, at 6.

71. 3 Water Market Update ___ (1989).

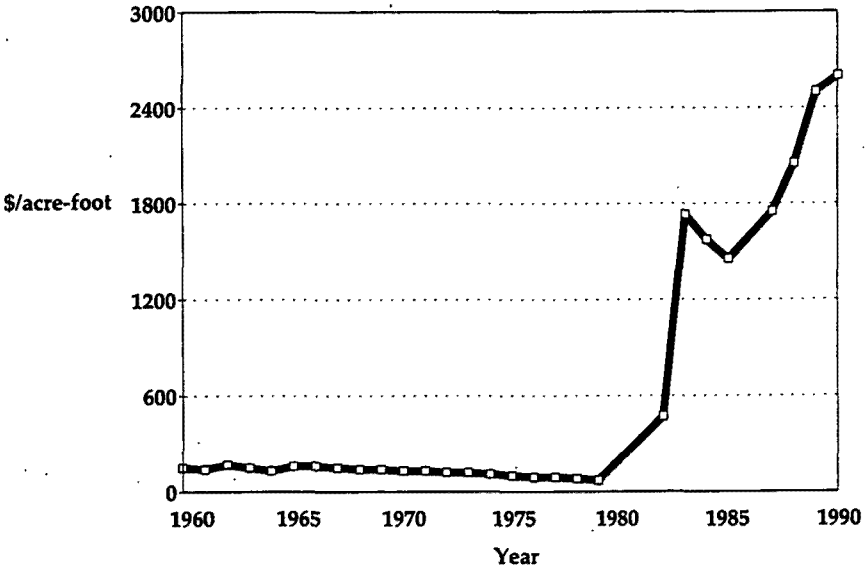


FIGURE 2
Market Prices for Water Rights
Truckee River Basin, Nevada

storage and direct flow rights available for growing demands in the lower Carson and Truckee Basins.[72]

### Interstate Conflicts: California and Nevada

The State of California, as a party to the federal decrees and interstate compacts that govern the Carson and Truckee Rivers, has a vested interest in surface water allocation. However, diversions for use in California are small relative to those in Nevada and are largely protected under existing agreements.[73] The current interstate conflict involves shared groundwater basins that Nevada interests hope to tap for the Reno-Sparks area.

The Honey Lake Basin, located along the state border about thirty-five miles north of Reno, is the subject of recent controversy. Nevada investors purchased a large ranch in the basin intending to pump and transfer groundwater to Reno and Sparks.[74] California has responded by creating a special groundwater management district to govern pumping on its side of the border, anticipating purchases of California ranches to provide

72. *Id.*
73. *See, e.g.*, Nev. Rev. Stat. § 538.600 (1987) (California-Nevada Interstate Compact).
74. 2 Water Market Update ___ (1988).

water for Nevada cities.[75] The Nevada State Engineer placed a three-year moratorium on all appropriations and transfers on Nevada lands in the basin pending the completion of a United States Geological Survey study of the basin's characteristics and water reserves.[76]

### Water Quality Issues

Water quality issues deserve particular emphasis because of the additional layer of complexity they add to regional water management. Fisheries require adequate clean, cool water and are affected by upstream urban and agricultural activities that influence water temperature and quality.[77] SPPC's and the City of Reno's plan to dispose of effluent through land treatment instead of river discharges raises another water quality issue.[78] This plan is designed to comply cost-effectively with new EPA discharge standards under the Clean Water Act.[79] The plan is controversial because treated effluent would no longer be returned to the Truckee River resulting in decreased flow levels.[80] Yet another problem has arisen as the cumulative adverse impacts of agricultural drainage on wetlands and wildlife resources have begun to be recognized at SWMA, downstream from TCID and the drain installed for the FPST.[81]

To summarize, water management institutions evolved during the first part of the twentieth century to clarify interstate allotment of surface water for mining and irrigation. In the 1970s, these institutions proved flexible enough to provide for growing cities through market transfers of water rights from irrigators. Environmental and tribal interests have now made their way into the arena, asserting that existing management arrangements and allocations do not serve their needs. Water quality problems have evolved over the last decade that further complicate the situation. Therefore, institutional response to changing pressures on the area's water resources should be re-evaluated.

## WATER MANAGEMENT INSTITUTIONS AND THEIR RESPONSIVENESS TO CONFLICTS AND CHANGING VALUES

### Overview

An institutional context for allocating the Truckee and Carson Rivers emerged in the late 1800s in response to interstate conflicts over the

75. S.B. 1721, 1989 Cal. Legis. Serv. 1329 (West) (Groundwater Management—Honey Lake Groundwater Basin).

76. Nevada State Engineers Office, 1987.

77. C. Buchanan & M. Coleman, *supra* note 50.

78. Sierra Pacific Power Company Annual Reports, 1988-1989.

79. *See generally* 33 U.S.C. § 1311, 1313 (1988 & Supp. 1990).

80. Sierra Pacific, *supra* note 78.

81. Fish & Wildlife Serv., *supra* note 65, at 6.

waters of Lake Tahoe, the construction of the Newlands Irrigations Project, and hydroelectric generation on the Truckee River. The Orr Ditch and Alpine Decrees adjudicated the relative rights of water users along the Truckee and Carson Rivers, respectively.[82] In 1955, the California and Nevada state legislatures authorized the negotiation of an interstate compact guiding the allocation of these two rivers. Although the states ratified the California-Nevada Interstate Compact in the early 1970s, Congress failed to approve it due to strong opposition from the Pyramid Lake Paiute Tribe, which contended that the compact did not recognize its interests in the Pyramid Lake.[83]

A federal water master administers all water rights associated with the Carson and Truckee Rivers and ensures minimum flows (called floristan rates) at the Truckee Rivers' Floristan stream gauge near the California-Nevada border.[84] The minimum flows vary from summer to winter and with Lake Tahoe winter storage levels. Storage releases maintain minimum flows when natural flows are insufficient. Maintaining these required flows can present a significant obstacle to more flexible river management. Because the Stampede Reservoir is designated to support endangered fish, the federal water master now administers Truckee River flows for this purpose as well.[85] The United States Fish & Wildlife Service provides technical support.[86]

The Operating Criteria and Procedures (OCAP) governing Truckee River diversions for the Newlands Project have been the subject of considerable controversy. The Pyramid Lake Paiute Tribe argued that, due to trans-basin diversions through the Truckee Canal to support the Newlands Project, not enough water was reaching Pyramid Lake to support the critical habitat of the endangered Cui-ui.[87] In response, the Bureau of Reclamation began devising new criteria to enhance flows into Pyramid Lake. The Bureau's recent proposals call for reducing water deliveries to the Newlands Project by twelve percent and increasing flows to Pyramid Lake by ten percent.[88] These reallocations will be realized through increases in agricultural water use efficiencies and by making greater use of the Carson River to meet the needs of the Newlands Project. Due to the proposed curtailments in their allotment, TCID has appealed the new

82. United States v. Orr Ditch Co., Final Decree No. A-3 (D. Nev. 1944), *cited in* United States v. Alpine Land & Reservoir Co., 878 F.2d 1217, 1220 (9th Cir. 1989); *Alpine Land & Reservoir Co.*, 878 F.2d at 1217.

83. *See* Nev. Rev. Stat. § 538.600 (1987); B. Saliba & D. Bush, *supra* note 3, at 141-51.

84. The floristan rate streamflow standards were originally set to protect hydropower production.

85. Fish & Wildlife Serv. *supra* note 65, at 7.

86. *Id.*

87. B. Saliba & D. Bush, *supra* note 3, at 142-51; D. Yardas, *supra* note 50. A federal district court in 1975 held that the Secretary of the Interior's 1972 OCAP violated the Secretary's trust duty to the tribe to maintain adequate water in Pyramid Lake to support the tribe's fisheries. Pyramid Lake Paiute Tribe of Indians v. Morton, 354 F. Supp. 252, 260 (D.D.C. 1973).

88. *Id.*

OCAP.[89] Reduced deliveries to the Newlands Project will diminish flows into the Stillwater National Wildlife Refuge, which depends upon the project's irrigation return flows for its inflows.

Administering Truckee River storage and flows to accommodate floristan rates, fisheries needs, and the varying priority of surface water rights is a highly complex process. Though not protected under existing institutions, levels in Lake Tahoe are under public scrutiny. Significant drops and rises in lake levels create outcries from area landowners, resorts, and tourism-related business, as well as from environmental groups. This, along with the impact of flows on downstream water quality and wetlands, makes the federal water master's job a delicate balancing act.

The Nevada State Engineer administers changes in ownership, point of diversion, place and purpose of uses of water rights in the Truckee and Carson Rivers.[90] Given the active market that has developed for water, the state engineer and Nevada water law play an important role in facilitating reallocation.

## The Framework for Voluntary Reallocation—Nevada Water Law

The Nevada Department of Conservation and Natural Resources, Division of Water Resources, oversees the state's water resources.[91] The Act of 1903 created the position of the state engineer to cooperate with the Secretary of the Interior in all construction works pursuant to the 1902 Reclamation Act. The state engineer's responsibilities include supervising the appropriation and transfer of water rights (except for federally-decreed streams), distributing water, and designating groundwater basins.[92]

Nevada relies on the prior appropriation doctrine for the administration of both ground and surface water.[93] The appropriative water right is usufructory in nature and must be acquired by the application of water to a beneficial use.[94] All ground and surface water in the State of Nevada belongs to the public and may be appropriated for beneficial use.[95] Most of the state's streams either have been or are being adjudicated. A federal water master administers the Truckee, Walker, Carson, and Colorado

89. U.S. Dept. of Interior, Bureau of Reclamation, Draft Environmental Impact Statement for the Newlands Project Proposed Operating Criteria and Procedures, at 68-69, and Pyramid Lake Tribe of Indians v. Hodel, 882 F.2d 354 (9th Cir. 1989).

90. Nev. Laws 1903, ch. IV; W. Hutchins, Nevada Law of Water Rights (1955).

91. W. Hutchins, *supra* note 90.

92. Nev. Rev. Stat. §§ 532.010, 538.600 (1987).

93. United States v. Walker River Irrig. Dist., 11 F. Supp. 158 (D. Nev. 1935); Walsh v. Wallace, 26 Nev. 299, 67 P. 914 (1902); Reno Smelting, Mill & Reduction Works v. Stevenson, 20 Nev. 269, 21 P. 317 (1889); Jones v. Adams, 19 Nev. 78, 84, 6 P. 442, 448 (1885).

94. *In re* Waters of Manse Spring, 60 Nev. 280, 108 P.2d 311 (1940).

95. Nev. Rev. Stat. §§ 533.025, 533.030, 534.020 (1987) ("Beneficial use shall be the basis, measure and the limit of the right to the use of water.").

Rivers, which are interstate streams governed by federal decree.[96] The State Engineer's Office oversees changes in point of diversion and place and manner of use of rights established in the federal decree.[97]

In recent years, many western states have designed instream flow policies to protect wildlife habitat and enhance recreational opportunities.[98] The Nevada State Engineer has granted appropriations for instream flow and storage in lakes in specific instances, but state law does not explicitly authorize instream flow rights and protection programs. Instream flow appropriations may be acquired for recreation.[99] In *State v. Morros,* the Nevada Supreme Court held that federal agencies can hold instream flow rights for wildlife purposes.[100] The court also affirmed that no absolute diversion requirement precludes the granting of an in-situ water right.[101]

Under Nevada statutes, all groundwater now belongs to the public, subject to existing rights.[102] If the state engineer finds that the replenishment to the groundwater may not be adequate to meet the needs of all permittees, he may declare the area a designated groundwater basin.[103] The general policy of Nevada water law has been to restrict groundwater withdrawals in designated basins to safe yield.[104] The state engineer may deny an appropriation within a designated groundwater basin if the proposed use will impair prior appropriators.[105] In the interest of public welfare, the state engineer may designate preferred uses if he determines that groundwater is being depleted.[106]

96. Nev. Rev Stat. § 538.600 (1987). The California-Nevada Interstate Compact allocates to Nevada 11,000 acre-feet of Lake Tahoe basin water, 80% of the Carson River water (minus 2000 acre-feet stored by California in the Lahontan Reservoir), 65% of the unallocated quantities of the Walker River, and any quantities of the Truckee River in excess of 46,000 acre-feet. The Pyramid Lake Paiute Indian Reservation and California have rights senior to Nevada's on the Truckee. Nevada also gets 300,000 acre-feet of water from the Colorado River. Arizona v. California, 373 U.S. 546, 565 (1973).

97. *Id.*

98. *See, e.g.*, Alaska Stat. § 46.15.080(b), .060(b) (1986); Idaho Code § 67-4307 (1989); N. M. Stat. Ann. § 72-5-23, -24 (1985); Utah Code Ann. § 73-3-1 (1989 & Supp. 1990).

99. Nev. Rev. Stat. § 533.030(2) (1987) (wildlife watering is included in Nevada's definition of recreation); *cf.* McClellan v. Jantzen, 26 Ariz. App. 223, 225, 547 P.2d 494, 496 (1976) ("when 'wildlife, including fish' and when 'recreation' were added to the purposes for appropriation, the concept of in-situ appropriation of water was introduced—it appears to us that these purposes can be enjoyed without a diversion").

100. 104 Nev. 709, 766 P.2d 263 (1988). The court held: "Although the United States . . . does not own wildlife, it owns land and may appropriate water for application to beneficial uses on its land." *Id.* at 268. The applications further the proprietary interest of the federal agencies as landowners. *Id.*

101. *Id.* at 226 (relying on Steptoe Livestock v. Gulley, 53 Nev. 163, 172, 295 P. 772, 774 (1931)).

102. Nev. Rev. Stat. § 534.020(1) (1987).

103. Nev. Rev. Stat. §§ 534.110(6), 534.120(1) (1987).

104. B. Saliba & D. Bush, *supra* note 3. "Safe yield" refers to an equal balance between groundwater withdrawals and recharge. Recharge includes those waters that replenish the groundwater source through both natural and artificial means. *Cf.* Ariz. Rev. Stat. Ann. § 45-561(7) (Supp. 1990).

105. Nev. Rev. Stat. § 534.120(3)(b) (1987).

106. Nev. Rev. Stat. § 534.120(2) (1987).

One can apply for three types of changes of a water right under Nevada law. These are changes in 1) place of diversion, 2) manner of use, or 3) place of use.[107] These changes are not mutually exclusive and can be performed simultaneously in any combination.

After the filing of an application through the State Engineer's Office, the statutes require public notice regarding the application to alert those parties who might have an interest in the proposed transfer.[108] Transfer applications proposing to move water across county lines are subject to an additional consideration. County commissioners are notified and hold public hearings to solicit input prior to making their recommendation to the state engineer.[109] Though the state engineer is not bound by the county's recommendation, hearings involving rural and agricultural interests may increase the sensitivity to local concerns.[110]

Resolving protests is an important and sometimes costly part of the transfer process.[111] Three methods of resolution are available: 1) private negotiation, 2) formal field investigation, and 3) formal hearing. Protests are rarely dismissed without either a hearing or a field investigation.[112]

The state engineer rules on change applications based on several criteria, including: 1) whether appropriable water is available, 2) whether the change would impair existing rights (including the value of other water rights), and 3) whether the proposed transfer may prove detrimental to the public interest.[113] Nevada statutes do not expressly define the public interest; the state engineer applies this criterion on a case-by-case basis.[114]

Parties who are dissatisfied with the decision of the state agency have the opportunity for a judicial appeal of the ruling.[115] Statutes require that "the decision of the state engineer shall be prima facie correct."[116] Therefore, the burden of proof is on the party challenging the decision. Gen-

107. Nev. Rev. Stat. § 533.040 (1987); Prosole v. Steamboat Canal Co., 37 Nev. 154, 161, 140 P. 744, 751 (1914).

108. Nev. Rev. Stat. § 533.345 (1987).

109. Nev. Rev. Stat. § 533.360 (1987); interview with R. Michael Turnipseed, Director, Surface and Water Adjudication Section, Nevada Department of Conservation and Natural Resources, Division of Water Rights, in Reno, Nevada (April 1988) [hereinafter Turnipseed].

110. B. Colby, M. McGinnis, K. Rait & R. Wahl, Transferring Water Rights in the Western States—A Comparison of Policies and Procedures (1989).

111. Nev. Rev. Stat. § 533.365(1) (1987). All protests are processed through the Reno office. Turnipseed, *supra* note 109.

112. B. Colby, M. McGinnis, K. Rait & R. Wahl, *supra* note 110, at 16.

113. Nev. Rev. Stat. § 533.370 (3) (1987); *see also* Griffin v. Westergard, 96 Nev. 627, 629, 615 P.2d 235, 237 (1980); Kent v. Smith, 62 Nev. 30, 140 P.2d 357 (1943).

114. Nev. Rev. Stat. § 533.450 (1987); B. Colby, M. McGinnis, K. Rait & B. Wahl, *supra* note 110, at 16.

115. Nev. Rev. Stat. Ann. § 533.410 (1985). The appeal must be filed both in court and with the state engineer. Intervention by other parties is also possible at this stage. Interveners must petition the court. The state engineer's decision can be remanded upon intervention to allow for the presentation of additional evidence. Turnipseed, *supra* note 109.

116. Nev. Rev. Stat. § 533.450(9) (1987).

erally, appellate jurisdiction lies with the district court for the county of the point of diversion. Pursuant to the jurisdiction of the federal water master over federally-adjudicated stream systems, federal district courts hear appeals involving the Truckee and Carson Rivers.[117]

## VOLUNTARY WATER TRANSFERS AS A RESPONSE TO CONFLICT AND CHANGING VALUES

As in many of the arid western states, much of the recent emphasis in Nevada water policy has been on transfers of water from one use to another. Initial activity centered on transfers from agriculture to serve growing cities. More recently, transfers have been initiated to enhance fisheries and wildlife and to resolve conflicts over the appropriate allocation of water between environmental, agricultural, and municipal uses.[118] The impetus for a voluntary market approach to resolving conflicts over water allocation is enhanced by a congressionally-approved water settlement that specifically authorizes market acquisitions of water to satisfy environmental needs.[119]

### Development of the Regional Water Market

Much of the market activity in this study area has involved Sierra Pacific Power Company. Sierra Pacific began purchasing irrigation rights to supplement its original Truckee River appropriations in the mid-1940s and continued to actively acquire additional water rights until 1979.[120] Figure 2 summarizes water rights prices in this region over the last several decades. All transactions reported prior to 1980 were Sierra Pacific acquisitions. Other buyers did not enter the market until the 1980s.

New impetus for water marketing emerged in the late 1970s when the United States Department of Interior reallocated the use of Stampede Reservoir from municipal and industrial purposes to providing water for fisheries pursuant to litigation by the PLPT.[121] SPPC and the cities had been counting on receiving additional storage rights in the reservoir. Meanwhile, a 1978 study of water resources and projected demands concluded that, given the current rates of growth in water use in Sierra Pacific's service area, water demand would exceed the firm yield of the company's existing water rights inventory within two or three years.[122]

Faced with an impending water shortage, Sierra Pacific put new developments on a lengthy waiting list pending the acquisition of sufficient

117. *See supra* notes 42, 49-50.
118. B. Colby, *supra* note 19, at 1113.
119. *See supra* note 61 and accompanying text.
120. B. Saliba & D. Bush, *supra* note 3, at 139.
121. *Id.* at 146.
122. Sierra Pacific Power Co., 1985-2005 Water Resource Plan (1985).

water rights. This touched off an intense political battle between the utility, cities, and developers.

Since the mid 1980s, a more orderly system of water rights transfers has operated to satisfy urban needs in the Truckee Basin. Sierra Pacific now provides water service to approved new developments using water rights provided to the utility by the appropriate local government (the cities of Reno or Sparks, or Washoe County) through 99-year leases.[123] Local governments acquire the water rights they lease to Sierra Pacific from developers, who must dedicate sufficient water rights or provide money for water rights acquisition as a condition for project approval. The cities of Reno and Sparks and Washoe County also acquire water rights appurtenant to lands in their jurisdiction by purchase or by condemnation if necessary.[124]

Groundwater rights in northwestern Nevada have sold for substantial sums of money. Prices have risen to unusually high levels in some isolated groundwater basins where development pressures are strong. In recent years, for example, groundwater rights in the Spanish Springs and Lemmon Valley areas outside of Reno and Sparks have sold at prices ranging between $4,000 and $18,000 per acre-foot.[125]

Sierra Pacific has considered acquiring additional water rights from sources outside the Truckee Basin to provide dry-year supplies and to support new growth.[126] Alternatives include buying surface water rights in Sierra Valley, California, and groundwater rights in the Warm Springs and Honey Lake valleys in Nevada. Ranches in Sierra Valley are irrigated using surface water rights from a number of sources, including the Truckee River. California opposition to such purchases has diminished interest in this particular alternative.[127]

Urban areas also are considering the Honey Lake basin as a future source for interbasin transfers to supply regional urban growth in the two states. Washoe County, for example, is pursuing a $100 million plan to import 22,000 acre-feet from this area.[128]

## Recent Water Transfers for Environmental Values

The region is beginning to see water transfers to protect endangered species at the Stillwater National Wildlife Refuge. Through a series of local, state, federal, and private water rights acquisitions, significant

123. Nevada Public Service Commission, Rule 1D, Docket No. 81-204 (1982), *revised*, Docket No.84-665 (1984); City of Reno Agenda Report No. 85-70 (1985).

124. Nevada State Senate Bill 323 (1983) authorized these acquisitions.

125. R. Turnipseed, Environmental and Water Allocation: Truckee River and Lake Tahoe 3 (1989).

126. Sierra Pacific Power Co., *supra* note 122, at 12.

127. *Id.*

128. B. Saliba & D. Bush, *supra* note 3, at 152.

amounts of water will be transferred to support the refuge.[129] The Nevada Waterfowl Association has purchased water rights associated with ten acres in the Truckee-Carson Irrigation District in order to improve wildlife habitat.[130] In order to mitigate against the adverse effects of new Truckee River operating criteria upon the refuge, regional public interest groups, sportsmen's groups, the Nevada Legislature, and Congress have worked cooperatively to provide water rights acquisition funds in order to supplement flows into the refuge.[131] TCID has endorsed proposals allowing farmers to transfer voluntarily water rights previously associated with marginal farmland for wetlands protection.[132]

On the federal level, Congress allocated $2.7 million to the Fish and Wildlife Service in the late 1980s to acquire parcels of irrigation rights for transfer to wetlands preservation.[133] The Nevada Legislature made up to $9 million available in 1989 through separate funds earmarked to settle water rights disputes in the Truckee basin and bond money allocated for parks and natural resource protection.[134] Another state bill enacted during the 1989 session clarified the definition of beneficial use to include "the watering of wildlife and the establishment and maintenance of wetlands, fisheries and other wildlife habitats," legitimizing water rights acquisitions to protect wetlands areas.[135]

Locally, the Nevada Waterfowl Association, the Lahontan Valley Wetlands Coalition, and the Nature Conservancy have spearheaded efforts to raise funds, purchase irrigation rights, and transfer them to wetlands purposes. Congressional passage of the Truckee-Carson-Pyramid Lake Water Settlement Act provided another important source of funding for water acquisitions.[136]

The Pyramid Lake Paiute Tribe typically has objected to out-of-basin transfers of Truckee River water because they want to protect flows vital to Pyramid Lake. Their objections present an obstacle to transfers for wetlands protection. However, in 1990 the Nevada State Engineer approved a new acquisition and transfer to enhance wetlands, involving the Nature Conservancy's purchase of approximately 400 acre-feet of water previously used to irrigate crops. The water rights, once transferred to their new use, would be sold to the United States Fish and Wildlife

129. *Id.* Congress, in approving an amendment sponsored by Sen. Hecht (Nev.), appropriated $1.2 million to purchase water rights adequate to support the refuge.

130. 3 Water Market Update, 4 (1989). The transfer application requests a change of location only, asserting that the Association will use water rights for irrigation of the natural vegetation in the wetland and so the transfer does not constitute a change in water use.

131. 2-3 Water Market Update (1988-89).

132. *Id.*

133. Congressional Appropriation, 2-3 Water Market Update (1988-89).

134. Nevada SB 189 (1989); Nev. Rev. Stat. § 538.600 (1987).

135. Nevada SB 332 (1989); Nev. Rev. Stat. § 244A.459 (1987).

136. *See supra* note 61.

Service.[137] This transfer would not reduce flows available for Pyramid Lake, and so PLPT did not attempt to block it. TCID withdrew its protest after the parties resolved questions about who would pay the operation and maintenance assessments for the water transferred from the district.[138] Resolution of this proposed transfer sets an important precedent for future transfers of water from irrigation to fish, wildlife, and recreation. A subsequent Nature Conservancy water acquisition will provide additional water to maintain the Stillwater Refuge and it appears that the voluntary reallocation approach to accommodating environmental concerns is becoming well-established in the Truckee-Carson basin.[139]

## SUMMARY AND POLICY IMPLICATIONS

The Truckee-Carson basin illustrates the emerging importance of environmental values in western water reallocation. Voluntary water transfers are playing an important role in incorporating instream flow and wetlands preservation into a legal and institutional structure that initially evolved to serve irrigators, mines, and power companies and then adapted to accommodate growing cities. Market negotiations among interested parties are proving to be an effective conflict resolution mechanism, reallocating water to satisfy environmental concerns and paving the way for more cooperative approaches to regional water management.

Interestingly, recent voluntary transactions to reallocate water from consumptive uses to wetlands and wildlife were preceded by decades of litigation and some involuntary changes in water management and allocation in this basin. Without litigation based on the Endangered Species Act, the PLPT probably could not have influenced water policy in the basin to a significant degree. However, armed with successes in court, the PLPT was able to successfully negotiate changes in river management that provided water to maintain Truckee River fisheries and the ecosystem surrounding Pyramid Lake.

The complementarity between court and administrative rulings and voluntary transfers is not limited to the Truckee-Carson Basin. The threat of involuntary water reallocation, based on such rulings, is becoming important in stimulating voluntary transfers elsewhere in the West. The much publicized transfer agreement between Metropolitan Water District of Southern California and Imperial Irrigation District might never have been reached if the State Water Resources Control Board had not threatened to involuntarily reallocate irrigation water based on a finding of wasteful use.[140] The National Audobon case described earlier has stim-

137. 3 Water Rights (H. Smallowitz ed. 1990) (published by American Society of Civil Engineers).
138. *Id.*
139. Water Intelligence Monthly 5 (Jan. 1991) (R. Smith ed).
140. *See* Imperial Irrig. Dist. v. State Water Resources Control Bd., 225 Cal. App. 3d 548, 275 Cal. Rptr. 250 (1990).

ulated increased interest in voluntary reallocations to provide the City of Los Angeles with water supplies to replace the water they can no longer take from the Mono Lake area.[141] A lawsuit filed by the Environmental Defense Fund and other parties in the 1970s resulted in a 1989 California ruling requiring a large bay area water provider to divert less than its full entitlement from the American River during dry years to provide flows for salmon and recreation.[142] The court also ruled that state wildlife officials could request up to 60,000 acre-feet per year in releases from an upriver reservoir if needed for fish and wildlife in the American River. This decision has prompted attempts to acquire water supplies from other water users through market transfers.

In Texas, the Guadalupe-Blanco River Authority has begun proceedings based on the Endangered Species Act to curtail groundwater pumping that it asserts is damaging free flowing springs and endangered species that rely on the springs. The River Authority would benefit from reduced pumping from the Edwards Aquifer because it relies on surface water supplies affected by the groundwater withdrawals.[143] Purchases of irrigated land and pumping privileges may be an important means of resolving this conflict.

Although a voluntary, market-oriented approach to resolving water conflicts is becoming more common, litigation undoubtedly will continue to be an important tool for environmental, tribal, and wildlife organizations seeking to protect and enhance wetlands and streams. Litigation has the drawbacks of being costly and protracted. Further, litigation evokes a sense of antagonism among those whose interests are at stake and this can be detrimental to future cooperative resource management efforts once the immediate conflict has been addressed by a court ruling. On the other hand, the threat of an unfavorable court ruling is a powerful incentive for successful negotiations and resolution of conflicts. From this perspective, litigation can stimulate negotiations, and this can complement a market-based approach to protecting environmental interests. The costliness and uncertainty of litigation encourages parties with diverse interests to consider negotiations and market transactions as a lower-cost means to resolve conflicts.

Although a voluntary market approach has many advantages in providing water to mitigate environmental externalities, environmental interests are not yet well represented in water market transactions. Those wishing to protect streamflow levels do not have legal access to water

141. *See* National Audobon Soc'y v. Superior Court, 33 Cal. 3d 419, 658 P.2d 709, 189 Cal. Rptr. 346 (1983).

142. Environmental Defense Fund v. East Bay Mun. Util. Dist., No. 425, 955 (Alameda County Super. Ct. June 14, 1989), *cited in* Stevens, The Public Trust and In-Stream Uses, 19 Envt. Law 605, 619 n. 63 (1989).

143. 3 Water Market Update July-Aug. 1989.

rights on the same terms as farmers, cities, and industry. In some western states, water rights may not be held for instream purposes; only Alaska and Arizona, of the western states, allow a private party to hold a water right for the purpose of maintaining instream flows.[144] Markets acquisitions could better reflect environmental values if state laws permitted appropriation, purchase, and seasonal leasing of water rights for stream flow and wetlands maintenance by both public and private organizations.

Another reason why more market transactions have not occurred is that the transactions costs for environmentally-oriented acquisitions are likely to be higher than for water rights purchased for offstream uses. Organizations wishing to use water rights to maintain stream flows often face opposition by neighboring water users who fear that the flexibility of their own rights will be constrained, and so they incur high costs in overcoming objections to the new instream use of the water rights. Further, many state agencies have little experience in handling applications to change the use of a water right from irrigation, for instance, to instream flow maintenance. New procedures and criteria often have to be developed, creating delays, uncertainty, and additional costs for the instream use applicant.

Even if obstacles to acquisition of water rights for maintaining wetlands and streams were abolished, environmental amenities have public good characteristics that make it difficult to translate collective values for streams, wetlands, fish, and wildlife into dollars to bid for water rights in the market place. The term "public good" refers to resources characterized by non-excludability, meaning it is difficult or impossible to exclude those who do not pay from enjoying the benefits of the resource. Many individuals who do place a positive value on preserving streams and wetlands may be "free riders," enjoying these resources but making no payments—since payments are not required. Funds raised to purchase water for wildlife, instream flow maintenance, and wetlands will not represent total willingness to pay by all potential beneficiaries. This is due to the free ridership phenomenon—the difficulty of collecting contributions from all who will benefit, and the lack of an incentive to voluntarily contribute, since those who do not contribute cannot easily be prevented from enjoying protected streams and wetlands. In spite of these obstacles, some environmental groups have successfully organized fund raising and donations to acquire water rights.[145] Furthermore, the public sector is also becoming more active in reserving water for wetlands and for instream flows.[146]

Increased awareness of the values associated with recreation, fish, and

144. L. MacDonnell, Instream Flow Protection: Law and Policy (1989).
145. Colby, *supra* note 19; L. MacDonnell, *supra* note 144.
146. *Id.*

wildlife will continue to exert pressure on water management institutions throughout the West. New battle lines are being drawn in the ongoing conflict over water resources. Environmental interests and Native Americans are beginning to play a key role in an allocation process from which they had been largely excluded. Water resource managers, public agencies, and legal doctrines are adapting to these newly recognized values in an effort to resolve conflicts over environmental externalities.

Voluntary transfers have been an important conflict resolution mechanism in the Truckee-Carson Basin and are likely to be important in resolving other water resource conflicts. However, voluntary reallocations to benefit the environment occur only when environmental interests have bargaining power and can command the of other parties. Often this bargaining power is achieved through costly and protracted litigation to establish the legal standing of environmental concerns. Once they become "legitimized," environmental interests have bargaining power because they can intervene in judicial and administrative reviews, imposing transactions costs on other parties and delaying approval for water projects and changes in water use. Armed with this bargaining power, environmental interests can effectively participate in negotiations over water allocation and environmental externalities. The subtle interplay between voluntary market reallocations and allocative decisions made by courts and administrators is complex and involves balancing the virtues of the market mechanism as a means for reallocation with the need to account for externalities and public values when water is reallocated.